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REVISED METEOROLOGICAL
INPUT TO SER

2.3.2 Local Meteorology

Climatological data from Toledo, Sandusky and available onsite data have been used to assess local meteorological characteristics.

Mean monthly temperatures at the site may be expected to range from about 28°F in January to about 74°F in July. Extreme temperatures of 105°F and -15°F have been reported at Sandusky.

Annual average precipitation in the site area is about 34 inches with about 60% occurring in the period April through September. The maximum 24-hour rainfall reported at Sandusky was about 5.6 inches. Annual average snowfall is about 29 inches. The maximum 24-hour snowfall at Sandusky was 12.3 inches.

Wind data from the 20-ft level of the original 300-foot onsite meteorological tower for the period December 1969 through November 1970 indicate prevailing winds from the west-southwest, southwest, and south-southwest occurred about 38% of the time. Winds from the southeast and south-southeast occurred least frequently at less than 3% for each direction. Calms occurred about 2.5% of the time.

Wind data from the 35-ft level of the 340-foot tower for the period August 1974 - August 1976 indicate prevailing winds from the south-southwest, southwest, and west-southwest occur about 37%. Winds from the east-southeast and southeast occurred least frequently at about 3.5% for each direction. Calms occurred less than 0.1% of the time during this period.

2.3.3 Onsite Meteorological Measurements Program

The current onsite meteorological measurements program, operational since August 1974, was two meteorological towers, 340-foot and 35-foot, located about 2000 feet wouthwest of the facility containment building. A temporary 35-ft tower was in operation from December 1973 to August 1974. On the 340-ft tower, wind speed and direction are measured at the 250-ft and 340-ft levels, vertical temperature difference measurements are made between the 35-ft and 250-ft levels and between the 35-ft and 340-ft levels, and ambient dry bulb temperatures are measured at 35-ft and 340-ft. Precipitation is measured at ground level. The 35-ft tower is used for 35-ft wind speed and direction measurements. This meteorological measurements program meets the recommendations and intent of Regulatory Guide 1.23 and is acceptable.

A meteorological program using a 300-ft tower was initiated in October 1968. Wind speed and direction were measured at the 20-, 100-, and 300-ft levels; vertical temperature gradient was measured between 5 feet and 145 feet and between 145 feet and 297 feet. Dewpoint temperature was measured at 5 feet. This tower was instrumented prior to issuance of Regulatory Guide 1.23. The construction of the facility structures and a change in grade elevation caused wind speed and direction data from this tower to be erroneous. However, data collected during the period December 1969 through November 1970 do not exhibit any interference problems.

The applicant has provided data from the 300-foot tower for the period December 1969 through November 1970. These data were in the form of joint frequency distributions of wind speed and direction data from the 20-ft level by atmospheric stability (defined by the vertical temperature gradient between 145 feet and 5 feet). Data recovery for this period was 82%. The applicant has also provided data from the 340-foot tower for the periods: August 4, 1974 through August 3, 1975; August 4, 1975 through August 3, 1976; and August 4, 1974 through August 3, 1976. These data were in the form of joint frequency of wind speed and wind direction data from the 35-ft level by atmospheric stability (defined by the vertical temperature gradient between 250 feet and 35 feet). Data recovery for these periods was about 93%.

We have calculated relative concentration (X/Q) values using each set of onsite data. We have some reservations about the quality of the onsite meteorological data collected during the period December 1969 through November 1970 primarily because of the lack of instrument calibration during the data collection period. Also, the lower temperature sensor for the measurement of vertical temperature gradient during this period was only 5 feet above the surface, which would tend to bias the resultant atmospheric stability distribution towards extremely stable and extremely unstable conditions. Therefore, the relative concentration values presented in Section 2.3.4 and 2.3.5 are based on data collected during the periods August 1974 - August 1976.

In Revision 11, the applicant has described the control room monitoring program for pertinent meteorological parameters. It includes digital displays of 15-minute averages updated every 15 minutes. The parameters to be included in the displays are: wind speed and direction at the 35-ft and 250-ft levels; vertical temperature gradient between 35 feet and 250 feet; ambient dry bulb and dew point temperatures at 35-ft, and standard deviations of wind direction at the 35-ft and 250-ft levels. In addition, there will be an instantaneous meter display of wind speed and direction at 35 feet, vertical temperature gradient between 35 feet and 250 feet, and ambient dry bulb temperature at 35 feet. The proposed control room monitoring program is acceptable.

2.3.4 Short-Term (Accident) Diffusion Estimates

In the evaluation of short-term (0-2 hours at the exclusion distance and 0-8 hours at the LPZ distance) accidental releases from buildings and vents, we assumed a ground-level release with a building wake factor, cA, of $1300m^2$. Relative concentration (X/Q) values for the various time period following an accidental release were calculated using the diffusion model described in Regulatory Guide 1.4 (Revision 2, June 1974).

The relative conce. ..-tion value for the 0-2 hour time period on onshore flow condi.. ons (defined as winds blowing from the west-northwest clockwise th. ugh southwest) which is exceeded 5% of the time is 2.2×10^{-4} sec/m^3 at the exclusion distance of 730m. This relative :entration is equivalent to that calculated assuming Pasquill Typ. ? stability with a wind speed of 2.0 meters/second.

We calculated the relative concentration values for various time periods at the outer boundary of the Low Population Zone (3200m) for onshore flow conditions (defined as winds blowing from the west-northwest clockwise through the southeast) to be:

Time Periods	X/Q sec/m^3
0-8 hours	8.2×10^{-6}
8-24 hours	5.7×10^{-6}
1-4 days	2.6×10^{-6}
4-30 days	8.0×10^{-7}

2.3.5 Long Term (Routine) Diffusion Estimates

In the evaluation of diffusion estimates for routine releases, a "Straight-Line Trajectory Model," for ground level releases as described in Regulatory Guide 1.111 (March 1976) was used. An estimate of maximum increase in calculated relative concentration and relative deposition (D/Q) due to recirculation of airflow, not considered in the straight-line trajectory model, was included in the calculations. The calculations also included consideration of radioactive decay of effluents and depletion of the effluent plume. Calculated values of X/Q and D/Q for specified points of interest are presented in Table 2.3-1.

2.3.6 Conclusions

We conclude that two years (August 1974 - August 1976) of onsite meteorological data provide an adequate meteorological description of the site and vicinity, and that these data provide an acceptable basis for calculations of reasonably conservative relative concentration values for assessments of post-accident and annual average atmospheric diffusion conditions.

TABLE 2.3-1

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CONTROLLING RELATIVE CONCENTRATION (X/Q) AND RELATIVE
DEPOSITION (D/Q) RESULTING FROM ROUTINE RELEASES

		DIRECTION	DISTANCE MILES	X/Q (sec/m^3)*	D/Q(m^{-2})
Site Boundary	A	N	.45	1.7×10^{-5}	-----
	B	N	.45	3.3×10^{-5}	-----
	C	N	.45	3.8×10^{-5}	-----
Residence/Garden	A	W	.60	5.3×10^{-6}	6.3×10^{-8}
	B	W	.60	1.1×10^{-5}	1.3×10^{-7}
	C	W	.60	1.2×10^{-5}	1.5×10^{-7}

A = Continuous

B = Gaseous Waste System (15 purges/yr, for 8 hrs each)

C = Containment Purge (24 purges/yr, for 2 hrs each)

* No Decay, No Depletion